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THE SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

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18 DEC 1975

Honorable Melvin Price
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

(U) In regard to your letter of November 10, 1975 concerning the FFG-7 Class Guided Missile Frigates, I have examined the program and, more particularly, the points you raised concerning it.

(U) The DSARC has recently given the FFG-7 class program an intensive review and I have approved their recommendation to proceed with procurement of this ship. Except for an evaluation of the FFG's seakeeping qualities, the DSARC review included each of the points raised in your letter.

(U) With regard to cost, this program has experienced the same proportional cost increases that have occurred in other shipbuilding programs. For example, the Navy estimates that a DD-963 class destroyer, identical to those now under contract, would cost approximately \$229-241 million if procured in FY 1976 as an add-on to the present 30 ship contract. This is almost twice the expected FY 1976 cost of \$134 million for the FFG-7 class ships even though the latter cost relates to ships built early in the production run. Moreover, the FFG-7 has been designed to complement existing sea control forces by providing a quick reaction Anti-Air Warfare capability to defend against submarine-launched anti-ship missiles. The DD-963 has no such capability to offer. Modifications to provide this capability would substantially increase the DD-963 cost estimate. The original cost estimate for the FFG-7 was \$50 million in FY 1973 dollars. Expressed in the same dollars, the original estimate for the DD-963 was \$91 million. Thus, it is evident that the ratio of costs between FFG-7 class ships and DD-963 class ships has been much the same since these programs were initiated.

(U) Another important factor to be considered is the life cycle cost. The annual operating cost of each FFG-7 class ship is about \$2.1 million less than that of each DD-963 class ship in FY 1976 dollars. Thus for a thirty year life, the operating cost for each FFG-7 will be at least \$63 million less than each DD-963.

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(U) As you noted, there were only a limited number of bids submitted for these ships. The Navy was particularly disappointed at the absence of bids from the lower cost yards. It is important to note, however, that these bids will affect only the FY 1975 and 1976 FFGs (9 ships). The Navy intends to readvertise and to competitively procure FFGs in FY 1977 and FY 1979 with options for the following year in each case. If the program size is attractive, it should command wider shipbuilder interest in those years.

(C) In its review, the DSARC gave special consideration to the military effectiveness of the FFG-7 class ships. It was impressed with the results of the test and evaluation on various weapons and sensor systems and with the success in integrating them into an overall combat system. The fire control system, air search radar, and command and decision system exceeded the reach and reaction times required to achieve the full potential of the missiles. The versatility of the missile launching system, which can carry a mix of up to 40 STANDARD missiles and HARPOONS, is outstanding. The 76MM gun performed impressively in both the anti-ship and anti-air roles.

(U) The sonar has not yet met its performance requirements. We were satisfied, however, that the Navy's program to improve the sonar will permit it to meet or exceed its current performance specifications. To augment this active sonar, I have approved the Navy's plan to install a towed passive sonar array in the FFG to significantly increase detection ranges. This towed array, together with the two LAMPS helicopters already included, will make the FFG-7 class ships extremely effective against submarines.

(U) The shape of the bow and the hull form of the FFG-7 class were particularly designed for good seakeeping qualities and a dry deck. Exhaustive tests in the Naval Ship Research and Development Center have validated the design to the maximum extent possible prior to actual experience at sea. We are confident that the FFG will have excellent seakeeping qualities.

(U) With regard to the ship's speed, the Navy expects full speed in the vicinity of 30 knots with a continuous, economical speed of 28 knots. Considering the long range sensors and weapons systems installed in this ship and its intended role in support of naval or mercantile shipping, the 28 knot speed is considered ample for maneuvering and maintaining station with a convoy or task group.

(U) In summary, the DSARC has carefully considered the FFG program in terms of suitability, producibility and cost. I share their view that the FFG-7 class ships will be the lowest cost ships that can effectively

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perform the intended mission. We believe that it will provide a significant contribution to total force effectiveness at a cost that will permit procurement in quantity.

(U) I earnestly urge you and the other members of the House Armed Services Committee to support the Navy's request for these ships.

Sincerely,

Bill Clements
Deputy

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10 Nov 75

The Honorable William P. Clements, Jr.
Deputy Secretary of Defense
Washington, D.C. 20310

Dear Mr. Clements:

This letter is in response to your letter of October 21, 1975, especially with respect to the expected cost increase in the Guided Missile Frigate (FFG) -- formerly the Patrol Frigate -- program.

I am seriously concerned about the FFG program from both cost and effectiveness points of view. The Committee is, of course, aware that the FFG is a "design to cost" weapon system on the low side of the so-called "high-low mix". However, the latest Selected Acquisition Report (SAR) available to the Committee, dated June 30, 1975, causes me to doubt that the FFG can any longer be considered as a low cost item. My doubts are reinforced by the fact that the Navy and the taxpayers are obtaining very little offensive or defensive capability for the billions of dollars expected to be spent on the FFG.

According to the July 1975 SAR, total procurement costs for the FFG have increased from \$3,230.4 million (in FY 1973) to \$6,768.7 million (in July, 1975), a total increase of \$3,537.7 million and an increase of only six ships over the 50 ships originally planned. The SAR shows that program unit costs have increased from \$54.89 million to \$121.111 million over the same period -- an increase of \$56.131 million per ship. While your letter does not disclose the bids received from the three shipyards which exhibited an interest in the FFG, you do indicate that \$57.2 million additional is required in order to contract for the three ships authorized in FY 1975 -- an increase of \$19.06 million per ship even with the full funding waiver applicable to the FY 1975 program. In view of this increase, it seems reasonable to assume that FFG unit costs will work out to be significantly higher than those contained in the July, 1975 SAR.

Also of concern to me is the fact that only three shipyards saw fit to bid on the FFG, which was advertised as a three shipyard program. Two of these yards are under the same corporate ownership, while the third is

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the contractor for the lead FFG. In other words, there was no opportunity for price competition since each bidder will, if the award is made, contract for one ship each with options for 52 follow-on ships probably split between the three yards. It appears that the result will be to "lock-in" three shipyards on a very large program on the basis of initial bids which were not obtained by maximum competition. I am not comfortable with this situation.

Another source of concern is the FFG's lack of military capability. The FFG is a small, 3,585 ton, single screw, 28 knot ship armed with a single 76 mm. gun, a single Standard (MR) area defense missile launching system and two torpedo tubes. The 5.1 mile maximum range of this ship's sonar system, coupled with its slow speed do not provide the FFG with a capability to defend itself, or the ships it might escort, against submarines. The size of the ship will seriously diminish its sea keeping ability except in the lowest of sea states. The FF-1052 class, a similar but heavier ship, has notoriously bad seakeeping qualities. In addition, the FFG's small magazine capacity and growth potential limit the ship's usefulness.

The above cost and effectiveness considerations raise questions with respect to the continuation of this very expensive program. The Navy now has only 177 surface combatants and, I realize, desperately needs to increase that number. However, it is a false economy and gives one a false sense of security to place 56 new but incapable ships in the Navy's inventory. The expected unit cost of the FFG is now apparently approaching the unit cost of the DD-963, and a comparison of the capabilities of the two ships would indicate that we would receive far less defense for the dollar by continuing the FFG program than by opting for a ship of higher military capability.

I understand that the DSARC for the FFG occurs in January of next year and that the FFG contracts will not be awarded until after that time. In view of the above problems with this program, I would suggest that the program be reviewed and consideration be given to the procurement of a DD-963 or a variant of that ship to fulfill the FFG's requirement. As you know, the DD-963 is now being produced in series. It is a heavier (7,600 tons), and faster ship capable of carrying heavier and more effective weapons and has an excellent ASW capability.

The Armed Services Committee and I will look forward to your comments on this matter.

Sincerely,

Melvin Price
Chairman

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DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D C 20350

16 June 1975

The Honorable John L. McClellan
Chairman, Committee on Appropriations
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

The Comptroller General in his letter of 10 June 1975 raises several questions relating to the Navy's surface combatant ship building program. A number of these cannot be considered in isolation from the question of where we are headed with the Navy's surface combatant force in its entirety and I must, therefore, take fundamental exception to many of the points and conclusions. I deem it important that I present my views to you at this time.

The number and mix of ships that we maintain in the U.S. Fleet has to be derived from the national security objectives that the fleet is required to support, the threat that our naval forces will face in the years ahead, and the risk we are willing to accept in achieving our objectives. Since the nation's vital interests depend on our ability to use the sea lines of communication to support our deployed forces and allies, to enhance international stability and to maintain commerce, we must continue to plan for adequate, effective and balanced naval forces.

Specifically with respect to surface combatants, we seek to attain the necessary mix of highly capable guided-missile-equipped cruisers for sea control and projection missions in high-threat areas, and the requisite larger numbers of destroyers and frigates that not only operate in mutual support with our carriers and cruisers, but must also carry out multi-purpose missions in the more numerous areas of lower threat. The fiscal constraints that we face make such a high-low mix mandatory.

Our best estimate of the requirements for surface combatants lie between 240 at the low end and 320 or more at the high end of the threat spectrum -- depending on the numerous assumptions which must be made in attempting to analyze future warfare scenarios. The Major Fleet Escort Study (1967) was a joint Defense-Navy effort to bound those requirements and follow-on, continuing analyses and annual program reviews have challenged, and confirmed, those numbers over the period since that landmark study was completed.

In focusing on 240 surface combatants as the hard, total surface combatant force requirement, the Comptroller General's letter ignores both the range of uncertainty and the related ambiguities of threat and assumptions which attach to the analytical results. I am not as confident as he is that I know the exact required number. I am certain, however, that Soviet maritime power is expanding and that qualitative improvements in their ships, aircraft and submarines increase the risk we are accepting with the shipbuilding program we are now pursuing - one which is building toward a perceived minimum force level. Also, our past experience of living with an existing force, our WW II ships, and with a building program which could not maintain a modern fleet has taught us that we cannot maintain an effective force without an adequate and continuing shipbuilding program.

The Comptroller General expresses the concern that the Navy, by pursuing its intended building rate for the PF program will either go over the 240 ship limit for surface combatants or be forced to retire warships with useful life remaining. In this connection he asserts that "it is not clear from the available data and our calculations that the full 56 ship PF program is, in fact, required" and that "a future annual building rate averaging 8 ships would meet our 240 ship force level." In addition to the aforementioned 8 per year rate, he also suggests that 4 per year would suffice to build to the desired force level if a 30 year life were accepted. Elsewhere he observes that if the Navy merely builds the four PF's already authorized, it can maintain its present force level. This is seriously misleading since it ignores the fact that ships in the inventory are constantly aging and that an orderly annual replacement program must be carried out unless future fleet effectiveness is to decline. Clearly, these proposals are not consistent with our objective of building and maintaining effective American seapower. Rather, by employing misleading "snapshot" force level pictures, and not considering future position, they invite us to take a short route to gross naval inadequacy.

It must be borne in mind that the 240 ship objective includes active fleet units, ready Reserve, and Coast Guard ships -- all of which together constitute the total surface combatant force of the United States in time of war. In his discussion of force levels and construction rates, the Comptroller General deals only with the active fleet ships. The Navy plans to transfer 26 ships now in the active fleet to the Naval Reserve Force to replace 35 year old WW II reserve destroyers between now and 1985. Allowing for this planned action and assuming the active force level objective of 198, a building rate of 10+ PFs a year is well substantiated and will not force the Navy over its force level objective. If we consider a 25 year service life, the deficiency in active ships through 1985 is not 43 ships but 60 ships. If we consider a

30 year service life the deficiency is 51 ships. Since the service life will vary between 25 and 30 years, our minimum requirements lie between 51 and 60 ships - not precisely 43 - and our recommended program is well supported. Additionally, in the period 1985 - 1990 46 more surface combatants will reach the end of their 25 year service life (or 19 more if you use a 30 year service life). It is obvious that we must build a considerable number of PF's in the 1975 - 1985 time frame. Our requirements are significantly in excess of those stated by the Comptroller General if we are to maintain an effective naval force.

Going beyond force level and construction rate considerations, the Comptroller General recognizes that "the PF program clearly will augment the capabilities of the force of surface combatants, particularly in the area of anti-air warfare, by adding PFs to the existing forces and by replacing less capable ships" but he suggests that because of ASW shortcomings the Patrol Frigate total ship capabilities are inadequate to fulfill her assigned mission. Specifically, he takes exception to the choice of a short range sonar for the ship. He further asserts that inadequate design margins for future changes in the PF will render it infeasible for the Navy to bring about improvements.

The PF characteristics were selected so as to provide maximum mission effectiveness while giving due consideration to the fiscal constraints that dictate lowest possible cost in order to permit acquisition of the requisite numbers of ships. The Navy is convinced that the configuration selected best achieves that end.

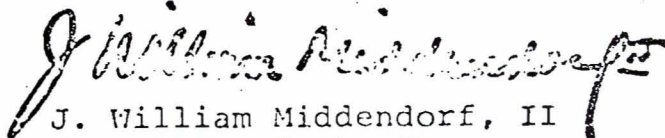
During the configuration process, a high frequency, high resolution direct path sonar was selected. This sonar, combined with the LAMPS helicopter system and the MK-46 ASW torpedo tubes, provides the PF with a highly effective ASW weapons system which, additionally, will best complement the capabilities of other ASW ships, some 100 of which will carry the longer range SQS-26 sonar. Finally, the Navy plans to augment the PF suite with the long range passive ETAS system during the 80's as this new system becomes available. Contrary to the Comptroller General's assertion, the backfit of ETAS is completely feasible, even considering such factors as space, weight, power, speed, endurance, and stability. The Navy knows of no basis for the Comptroller General's doubts that a "full capability ETAS" can be installed when available. Moreover, the derivation of the term "full capability" is unknown as the Navy presently contemplates only a single model of ETAS for all available platforms. Full information on the Navy's plans for ETAS in the PF was made available to the GAO staff before the Comptroller General's letter was issued.

In summary, each of the points raised by the Comptroller General has been carefully considered by the Navy in arriving at the required PF program, including the configuration of the Patrol Frigate itself and formulation of the PF production plan. The Navy remains convinced that production of the PF in the numbers and at the rate requested is consistent with the national interest and vital to national security. Your support of this program is earnestly solicited.

For your information, I have attached a paragraph by paragraph commentary on the Comptroller General's letter.

I am sending identical letters to the Chairmen of the Senate and House Committees on Armed Services and the Chairman of the House Committee on Appropriations.

Sincerely,


J. William Middendorf, II
Secretary of the Navy

NAVY COMMENTS ON GAO LETTER OF JUNE 10, 1975

The GAO comments can be grouped into several main categories and, in the interest of clarity, Navy comments will address the subject in that manner.

I. FORCE LEVEL METHODOLOGY

GAO Comment. The methodology by which the numerical requirements for U. S. Navy surface combatants was calculated is based on the ASW protection of 12 carriers, 10 underway replenishment groups, lift shipping for 1 1/3 Marine division/ring teams and 5 military resupply ship convoys. The numbers of surface combatants considered necessary for each of these high value units, however, are derived from a study that is some eight years old and uses older systems and capabilities rather than the dramatically improved ones expected in the 1980's. In determining force objectives and the related size of the proposed PF program, it seems that new planning factors should have been used or, if they could not be developed in time, that some adjustment in the old ones to reflect current systems performance forecasts would have been in order.

GAO Comment. Further complicating the problem of determination of force levels, is the fact that the Navy plans to add to ASW capabilities with the 688 class attack submarine in the direct support role. This should also tend to reduce the number of surface combatants required and it does not appear that this factor was taken into account in computing surface force objectives.

GAO Comment. The Secretary of Defense, in his annual report, identifies the surface combatant deficit as about 30 ships with this deficit to be filled, in part, with PFs. It seems likely that if high-capability ASW ships were substituted for the PFs, as presently configured, new calculations based on much longer range ASW systems would show the deficit to be substantially less than 30 ships. Only a few ships saved could more than compensate for the augmented unit ASW capabilities, leaving a potential for overall savings.

NAVY COMMENT

The determination of Navy force levels is not the result of nor does it rest on a single study or set of conditions. The determination of force levels for any given period has to be derived from our national security objectives, possible enemy capabilities and intentions, and the degree of risk we are willing to accept in meeting our objectives. JCS requirements, stemming from the needs of the specified and unified commanders, are annually reviewed along with the effects of current fiscal policy and qualitative weapons system improvements in arriving at the Secretary of Defense's policy regarding force levels.

Our current best estimate of the surface combatant requirements lie between a low of 240 and a high of 320 depending on the severity of the threat anticipated and the many assumptions that must be made in attempting to define future warfare situations. The Major Fleet Escort Study of 1967 was a joint Defense - Navy effort to bound surface combatant requirements and follow-on and continuing analyses and annual program reviews have challenged, updated, reviewed and confirmed those numbers over the period since the study. Thus, current, updated forecasts are continuously taken into account in our force level deliberations.

Total Navy requirements must give consideration to the contribution of the several elements of our forces. We do not consider surface combatants in isolation but rather their operations and requirements are determined in conjunction with those of our submarines, carriers, etc., in meeting the overall Navy missions in support of national objectives. The GAO comment that we have assigned the SSN 688 class submarines an additional mission of providing direct ASW support to our carrier forces is correct. This is one of the continuing changes that must be made in the face of the changing threat. The Soviet submarine force is rapidly changing toward an all nuclear powered force which significantly increases its capability even though total numbers are not increased and in fact may decline. Thus, the threat to our high value forces increases and we have been able to partially counter it by using our new, more capable submarines in a supporting role. This fact does not mean that we can concomitantly reduce our surface combatant forces. We do indeed consider such a possibility, however, the increased Soviet threat greatly increases the risk of taking such a step. The Navy considers this risk to be unacceptable.

The GAO proposes that fewer high-capability surface combatants with longer range ASW systems would reduce the Secretary of Defense's stated deficit of 30 ships and thus reduce the requirement for PFS. In the same manner that we consider the necessary balance between the various elements of our fleet, we also take into account the composition of each element.

We have found over the recent years that existing fiscal realities make it impossible to acquire high-capability surface combatants in the numbers necessary to meet the many requirements for this segment of our force. Also, there are many missions that can be effectively carried out by units with less than a maximum capability. We must, therefore, in order to obtain the most effective surface combatant force within available resources, develop the necessary balance between expensive high-capability ships and less-expensive ships which can effectively carry out the numerous missions that require less than a maximum capability.

This balance is under constant review and the requirements for ships to insure the maintenance of our open ocean sea lines are balanced against the needs for more capable ships to carry out the high-threat sea control and projection missions. The stated Secretary of Defense deficit of 30 surface combatants has taken into account the best mix of surface combatant type ships possible.

II. FORCE LEVEL CONSIDERATIONS

GAO Comment

Looking at the force buildup in isolation from the requirement for Anti-Air Warfare (AAW) ships, it is not clear from the available data and our calculations that the full 56 ship PF program is, in fact, required. Counting ships now in the active fleet and those to be delivered from other programs, and using an expected service life of 25 years, active Navy surface combatants would total some 188 ships in January 1985. (See enclosure) This leaves 43 needed to achieve the objective of 193 ships. Assuming deliveries by January 1985 (from the FY 1976 through FY 1980 PF programs) an annual building rate averaging 8 ships would be required in addition to the three PFs in the FY 1975 program. This is 2-3 ships a year less than the rate of 10 to 11 that has been proposed to satisfy the requirements of the active fleet.

GAO Comment

The 25 year expected service life criterion used in our calculations may be low, particularly for larger ships. If the Navy could plan 30 years of service from surface combatants -- the approximate age of some twenty-two active fleet ships now -- then it appears that the force build-up could be implemented with about four PFs each year, FY 1976 through FY 1980.

GAO Comment

Looked at another way, proceeding at the proposed construction rate of 10-11 PFs annually could conceivably result in the premature retirement of underage ships from the active fleet. By January 1985, some 12 ships would be retired early under a 25 year life criterion or 30 ships under the 30 year life criterion. We appreciate the fact that ships may be retired because of obsolescence rather than age. In order to avoid such premature retirements, however, the Navy often undertakes extensive modernizations of many surface combatants by backfitting new systems, typically, at about the middle of their life spans. Although expensive, these modernizations appear to be less costly than building comparable new ships.

GAO Comment

Without a buildup and using all surface combatants under 25 years of age, current force levels could be maintained through FY 1983 without any PFs other than the four already funded in FY 1975 and earlier. Without the three FY 1975 PFs, the deficit would be only two ships.

NAVY Comments

The Comptroller General bases his argument on the Navy's total force requirements for a total of 240 surface combatants leading to active fleet requirements for 198 ships, as follows:

240	Total Force
Less 30	Reserve Ships
Less 12	Coast Guard Ships
198	Active Fleet Ships

In his discussion of surface combatant force levels, the Comptroller General deals only with the active fleet ships. It is obvious that the reserve force ages with time and if the reserve ships, which make up a part of our surface combatant force levels, are to be effective on mobilization, they must be replaced with effective units as they reach the end of their useful lives.

The Navy presently plans to replace, between now and 1985, 26 WW II destroyers now in the Reserve which will be well over 30 years old with no service effectiveness remaining. This replacement can only be carried out by transferring the older active fleet ships to the reserve as new units become available.

On 30 June 1975, our active fleet surface combatant force level will be 164 ships.

If we consider a 25 year service life for active fleet ships, and the transfer of ships to the reserve, the deficiency in active fleet ships through 1985 is not 43 ships but 60 ships and the 10 to 11 PF building rate will not fully meet force level requirements.

If we consider a 30 year service life, between now and 1985 we would still have to replace the reserve ships and our active fleet force level would be 147 ships (if we do not consider adding additional PF ships to the force). Hence, without the PF program our surface combatant force level would be deficient by 51 ships. Thus, even with a 30 year service life (which will not be possible in all cases) our requirements support a PF building program over the 5 year period significantly in excess of that stated by the Comptroller General. Since our active fleet ships have service lives that vary between 25 and 30 years, our minimum requirements lie between 51 and 60 ships and our desired program is well supported.

Additionally, we cannot address the existing force levels and required building rates as a "snapshot" of the forces existing in 1985. Ships continue to age and in the period 1985-1990 46 additional surface combatants will reach the end of their 25 year service life and should be replaced. If we consider a 30 year service life 19 additional ships would be required. To maintain the requisite force levels, and considering the 4 years required to build a PF, it is obvious that we must build a considerable number of PF ships in the 1975-1985 time period if we are not to be faced with another huge block obsolescence problem that could not be funded with the then existing available resources.

III THREAT ASSESSMENT

GAO Comment. It is our understanding that United States Intelligence assessments do not lead to a conclusion that the USSR plans increases in its fleet. On the contrary, as the Soviets continue to modernize the submarine force with nuclear power, the available data indicates some reduction in overall numbers.

GAO Comment. A rate of qualitative advances in Soviet forces faster than our own would disturb the naval balance and justify offsetting quantitative adjustment on our side, but it is not evident that any such advances are in the offing. With regard to U.S. surface combatants, the data suggests that qualitative advances over the next ten years will be at a rate well beyond that normally experienced and should outpace or at least keep abreast of advances on the other side. For example, new Anti-Submarine Warfare (ASW) systems such as the escort towed array and the LAMPS III helicopter are expected to significantly extend the ranges at which surface combatants can detect and attack submarines. Introduction of the HARPOON missile will have a similar effect on anti-surface ship capabilities. The extension of the ranges of weapons should, of course, reduce the total number of ships required.

NAVY Comment

United States intelligence assessments do not anticipate any substantial increase in the numerical strength of the Soviet Navy in the next ten years and, in fact, believe some small downward adjustment in numbers may occur as older units with limited capabilities are retired. However, there is broad acceptance that the major qualitative improvement program initiated by the USSR in the past several years will continue unabated with the end result that Soviet capability to oppose the U. S. and its allies on the open oceans will steadily increase.

The Soviet Navy achieved a substantial numerical advantage over the U.S. Navy some years ago, and that ratio has widened to about 4 to 1 as the size of the U.S. Fleet was reduced over the past few years. The U.S. Navy has maintained a substantial overall superiority in war fighting ability on the open oceans because a large portion of the Soviet Fleet was designed to operate in coastal waters and had limited capabilities beyond those regions. However, the last decade has witnessed a large ocean going fleet with a wide variety of offensive and

and defensive weapons. Shipyards have been expanded to sustain this qualitative building program indefinitely, and all evidence points to continued expansion of their surface and submarine fleets that are increasingly capable of undertaking world wide missions and tasks.

In the recently completed Naval exercise, the Soviet Navy demonstrated their capability to employ air, surface and submarine forces in simultaneous attacks against adversary naval forces in the Norwegian Sea, the North-East Atlantic, the Mediterranean Sea, the North-West Pacific, the Philippine Sea and the Sea of Japan. In addition they displayed for the first time what appeared to be protection of their own merchant fleet in both the Atlantic and Pacific and interdiction against our sea lines in the North Atlantic, the North Pacific, the South Atlantic, and Indian oceans along major supply and oil tanker routes.

This continued qualitative improvement program of the Soviet Navy, accompanied by deployments on a continued worldwide basis, is an offsetting factor to improvements in U.S. surface combatant weapons systems set forth in the GAO comments. At best, we will be hard pressed to stay even with the known Soviet capabilities. This allows no margin for either reductions in our present Surface Combatant force levels or for any surprise Soviet ship or weapons improvements. In other words, there is no margin for error. In fact, the known Soviet shipbuilding programs lends urgency to carrying out our planned program for the modernization of our surface combatant forces with no reduction.

IV ADEQUACY OF PATROL FRIGATE CAPABILITIES

GAO Comment. Concerns about the PF stem from its "low-mix" characteristics. We have consistently supported the concept of high-mix and low-mix as a means of countering the rapidly rising costs of ship construction. In the case of the PF, it is a question of whether or not it has the capabilities, particularly the growth potential, to serve a full useful life in the U.S. active fleet. The Navy's experience with surface combatants that have been designed for very low costs has not been encouraging. For example, the Navy recently retired 17 ocean escorts of the Claud Jones, Courtney and Dealy classes from the active fleet when they were only 15-20 years old. They were relatively slow, small and lacking in growth potential. Not only did the Navy not get a full measure of active fleet service from these ships, but while active they contributed less in terms of effectiveness than would have less cost-constrained designs. At the time these ships were being retired, the Navy retained a substantial number of presumably more capable World War II surface combatants that were approaching 30 years of age.

CAO Comment. The PF program clearly will augment the capabilities of the force of surface combatants, particularly in the area of anti-air warfare, by adding PFs to the existing forces and by replacing less capable ships.

The requirement for better AAW capabilities -- which includes anti-ship missile defense -- presumably is in response to the formidable and growing air and missile threats. Some aspects of the Navy's surface combatant force planning and some implications arising from the characteristics of the PF, however, appear to us to need clarification before one can be confident that the PF is the appropriate answer to the Navy's requirements.

CAO Comment. While there appears to be little reason to question the adequacy of the PF's AAW systems for its planned employment in relatively low air threat areas, its limited anti-submarine warfare capabilities raise a number of questions. The PF has a low-powered, short-range hull-mounted sonar and has no provision for possibly backfitting the full capability escort towed array sonar (ETAS). According to the Navy officials, ETAS is urgently required along with other modernizations to enhance the ASW capability of surface ships. Although ETAS in some form probably could be backfitted into the PF, a penalty presumably would have to be paid in the form of removal of other equipment as weight compensation. Moreover, even if the weight problem were solved, constraints imposed by available space could lead to other capability-limiting compromises.

Comment. We understand that one concept holds that oceanic (DEs) will always be present with PFs and will compensate with their long-range sonars for the PF's ASW detection limitations. While this may be so under certain circumstances, it seems reasonable to assume that the Navy cannot always depend on having DEs present and appropriately stationed for this purpose. Battle damage or other unforeseeable events may prevent it, and tactical requirements may draw the DEs and PFs off station. It may also be desirable to station the DEs with ETASs at a distance from the protected formation where they could take a maximum advantage of their long-range detection capabilities and avoid high ambient noise levels near the formation. At the same time ASW considerations may require the PFs in stations much closer in where they may have to depend largely on their own ASW resources. No matter what the circumstances, it may be questionable to produce ships that must depend on the sensors of other ships to be fully effective.

GAO Comment. The HARPOON anti-ship missile is expected to give many of our ships an offensive capability against potentially hostile warships. However, the PF, armed with HARPOON, will be substantially inferior in top speed (at 28 knots) to virtually all modern Soviet surface combatants that are armed with anti-ship missiles. The significance of this is that the faster ship can often use its superior speed to engage or disengage at will and to adjust the engagement ranges to its liking. If the faster ship has longer range missiles--as a few Soviet ships have--it may even nullify HARPOON by remaining outside its maximum range. With the shorter range, but otherwise more lethal missiles that are on the newest Soviet ships, they can close to optimize the attack, actual or potential.

GAO Comment. The PF is, of course, quite a different ship than the DEs. It has broader capabilities including an effective ASW missile system. Nevertheless, there seems to be significant risk that the Navy will repeat with the PF the experience it had with the DEs. Its relatively low level of ASW capability and the lack of provision for the backfit of a full-capability ETAS, already noted, are critical. So also is the prospect that the PF will, like so many other ships, require a major modernization at mid-life. With such prospective modernizations some 20 years in the future the nature of the systems to be backfitted is hardly predictable. Major modernizations in the past have often meant substantial additional weight, and it would seem prudent to provide ample space, weight and moment reservations to accommodate a wide variety of possible backfit requirements. This apparently has not been done.

The Controller General cites the "low-powered, short-ranged hull-mounted sonar" and "no provision for possibly backfitting the full capability escort towed array sonar (ETAS)" as the basis for stating that the PF has "limited anti-submarine warfare capabilities". The PF sonar is equivalent or superior to all active, direct path ship sonars other than the large and expensive SQS-26 sonar installed in the DE 1052 and the "high-mix" surface combatants. The PF is also equipped with the MK 46 ASW torpedo and is fitted to operate two LAMPS III helicopters. In terms of force effectiveness, the PF ASW suite provides a highly effective capability and an optimum complement to the over 100 planned and existing SQS-26 sonar equipped surface combatants in the U.S. Navy.

The statement that no provision has been made for backfitting the full capability ETAS is not factual. The PF design gave consideration to the possible future use of towed arrays and ETAS can be installed in the PF without removing other equipment or impacting on performance. The use of the term "fully capable" ETAS suggests that installation in the PF would be, in some way, inferior to other ETAS installations. This is not correct. The ETAS installation in the PF would be the same as that which would be used in the DE 1052 class, and DD-963 class ships and any other potential ship candidates.

With reduced force levels that will be a fact of life in the foreseeable future, the Navy cannot build the maximum capability in every platform. Thus, it is essential in the design of each ship to consider the already existing capability or lack thereof in current fleet ships. The PF is perfectly capable of operating independently of other surface combatants and providing a high degree of ASW protection, and it would not have been prudent to have increased the size and cost of the ship by including the large SQS-26 sonar. The limited numbers of frigates available in the future for the protection of the open ocean sea lanes (DE 1052s and PFs) make it obvious that in practically every situation that can be conceived, a mix of these ships would have to be utilized. Due consideration was given to all of these factors during the PF design and the increased LAMPS capability, over that existing in the DE 1052 class, coupled with its more effective sonar for close-in attack situations not only provide an effective ASW system but provide maximum complement to the DE 1052 class ASW suite. Since both ships have the capability of being fitted with the ETAS the added capability and tactical flexibility provided by this system will only add to the capability and flexibility of our open ocean surface combatant force. It does not present an either-or situation.

Navy Comments

While supporting the concept of high-mix and low-mix as a means of countering the rapidly rising costs of ship construction, the Comptroller General makes a subjective judgement that the capabilities and growth potential of low-mix ships, including the PF, may not be good enough.

It is stated that the Navy's experience with low-cost surface combatants has been poor. The case of certain DE type ships is given as an example. The Navy did inactivate 17 ships of the Cloud Jones, Courtney and Dealey classes in recent years. This decision was not made on the basis that they were low cost ships but in view of the situation existing 15-20 years after these ships were built. Our WW II destroyers would reach the end of their service life in the near future and we had not been able to build the necessary replacements. It was essential, under the existing fiscal constraints, to retire our older ships that had not previously been modernized in order to provide the funds needed for force modernization. Thus, we inactivated some DEs while, in the interim, keeping some WW II ships that had undergone considerable large scale modernizations.

The PF mission requirements and the ship characteristics to meet them resulted from two years of extensive and detailed study and analysis. All systems, equipments and performance parameters were carefully selected to provide a ship which would retain its mission effectiveness through out the 1980s. Due regard was given to systems in development that would be applicable to the PF mission areas and provision was made for their later installation if required. The necessity to provide an effective ship that could be constructed at the minimum cost so that we could provide the numbers necessary to fulfill national commitments was a prime requisite and was in accordance with stated Congressional direction.

While an effective AAW capability was a major requirement for the PF, the total weapons suite was selected with a view towards balancing the overall surface combatant force composition in a multi-threat environment. Extended deliberations addressed the various trade-offs in arriving at a combat suite that would enable the ship to carry out its missions. It is well to note that current Soviet submarines have the capability to attack submerged with anti-shipping missiles as well as with torpedoes. ASW must also consider AAW and there is no longer a clear cut demarcation between the two threats. Thus, the PF's excellent area AAW capability is a vital requirement since no other existing frigates, except for the six BROOKS class, have a capability in this area.

The speed/HARPOON/ASM postulation has been thoroughly analyzed and the top speed limitation does not inhibit tactical employment and effectiveness of the PF. The generally discussed 28 knot speed is that speed which can be maintained on a continuous basis in at-sea operations and obtain maximum life of the gas turbine engines before they require replacement. Trial and full speeds lie in the vicinity of 30 knots. While this will still leave most Soviet surface combatants with a slight speed advantage over the PF, other factors nullify even that slight advantage. HARPOON outranges all Soviet SSNs except three. Two of those are carried by the oldest Soviet missile cruisers and destroyers, and the third cannot be targeted from beyond HARPOON range by its platform ship. Thus, in the majority of situations, even though they have a slight speed advantage, the Soviet ships must close to well within HARPOON range before they become a threat to our forces. With the LAMPS helos to provide targeting information for the PFs the Soviet ships would normally be engaged well before they could get within their missile range and thus any speed advantage is essentially negated. The speed advantage/disadvantage factor is, therefore, a marginal consideration with little to no actual effect on fleet operations.

think this is correct

With regard to the growth capability for future modernization, two points are pertinent.

- First, there are already over 100 tons allocated to space and weight for service life margin and future equipment substitutions and additions. For instance, space and weight is reserved for CIWS, mechanical ship stabilizers, an electronic warfare system, communications improvements, and helicopter haul-down, securing and traversing systems and, as previously stated, the ETAS can also be accommodated.

- Second, modernization need not involve "substantial additional weight." Wherein past modernizations frequently involved installing more, bigger, and heavier systems, the recent rapid strides in solid state circuitry, miniaturization, and modular replacement concepts permit modernization and improvement without significant, if any, increase in size or weight.

The Navy considers that the PF will provide an urgently needed and highly effective addition to U.S. surface combatant strength and will be capable of significant future modernization as new equipments become available.



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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B-133170

June 10, 1975

The Honorable Melvin Price
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

This letter deals with issues involving the patrol frigate program and the Navy's surface combatants in general. The budget request for fiscal year 1976 for the patrol frigate program is in the amount of \$1,095 million. This includes \$137.7 million for cost escalation in prior years and \$955.5 million for building ten patrol frigates. The following information may be helpful to you in your deliberations on that part of the Navy's Shipbuilding and Conversion Appropriation.

According to the Secretary of Defense, in his Annual Defense Department Report for FY 1976, the Navy plans a build up of surface combatant forces, including active fleet, Reserve and Coast Guard, from 211 ships at the end of the current fiscal year to 237 ships at the end of FY 1983 and later to a level of about 240 ships. Corresponding active fleet levels, are 165 at the end of FY 1975, 195 by the end of FY 1983 and the later objective of 198.

The Secretary of Defense indicated that the new patrol frigates (PF) are needed for the planned build up as well as the fact that there is a requirement for austere anti-air warfare ships for such missions as protection of relatively slow speed formations in areas of less severe air threat.

Three basic questions seem to emerge from the Department of Defense's announced plans. First, whether the construction schedule for PFs is consistent with force level objectives; second, whether the objectives themselves are justified; and third, whether the patrol frigate's capabilities are adequate. These are discussed, in detail, below:

PATROL FRIGATE CONSTRUCTION SCHEDULE

Looking at the force build-up in isolation from the requirement for Anti-Air Warfare (AAW) ships, it is not clear from the available data and our calculations that the full 56 ship PF program is, in fact, required. Counting ships now in the active fleet and those to be delivered from other programs, and using an expected service life of 25 years, active Navy surface combatants would total some 155 ships in January 1985. (See enclosure 1.) This leaves 43 needed to achieve the objective of 198 ships. Assuming deliveries by January 1985 (from the FY 1976 through FY 1980 PF programs) an annual building rate averaging 8 ships would be required in addition to the three PFs in the FY 1975 program. This is 2-3 ships a year less than the rate of 10 to 11 that has been proposed to satisfy the requirements of the active fleet.

The 25 year expected service life criterion used in our calculations may be low, particularly for larger ships. If the Navy could plan 30 years of service from surface combatants-- the approximate age of some twenty-two active fleet ships now-- then it appears that the force build-up could be implemented with about four PFs each year, FY 1976 through FY 1980.

Looked at another way, proceeding at the proposed construction rate of 10-11 PFs annually could conceivably result in the premature retirement of underage ships from the active fleet. By January 1985, some 12 ships would be retired early under a 25 year life criterion or 30 ships under the 30 year life criterion. We appreciate the fact that ships may be retired because of obsolescence rather than age. In order to avoid such premature retirements, however, the Navy often undertakes extensive modernizations of many surface combatants by backfitting new systems, typically at about the middle of their life spans. Although expensive, these modernizations appear to be less costly than building comparable new ships.

FORCE LEVEL OBJECTIVES

It is our understanding that United States intelligence assessments do not lead to a conclusion that the USSR plans increases in its fleet. On the contrary, as the Soviets continue to modernize the submarine force with nuclear power, the available data indicates some reduction in overall numbers.

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115K
A rate of qualitative advances in Soviet forces faster than our own would disturb the naval balance and justify off-setting quantitative adjustments on our side, but it is not evident that any such advances are in the offing. With regard to U. S. surface combatants, the data suggests that qualitative advances over the next ten years will be at a rate well beyond that normally experienced and should outpace or at least keep abreast of advances on the other side. For example, new Anti-Submarine Warfare (ASW) systems such as the escort towed array and the LAMPS III helicopter are expected to significantly extend the ranges at which surface combatants can detect and attack submarines. Introduction of the HARPOON missile will have a similar effect on anti-surface ship capabilities. The extension of the ranges of weapons should, of course, reduce the total number of ships required.

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The methodology by which the numerical requirements for U. S. Navy surface combatants was calculated is based on the ASW protection of 12 carriers, 10 underway replenishment groups, lift shipping for 1 1/3 Marine division/wing teams and 5 military resupply ship convoys. The numbers of surface combatants considered necessary for each of these high value units, however, are derived from a study that is some eight years old and uses older systems and capabilities rather than the dramatically improved ones expected in the 1980s. In determining force objectives and the related size of the proposed PF program, it seems that new planning factors should have been used or, if they could not be developed in time, that some adjustment in the old ones to reflect current systems performance forecasts would have been in order.

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Further complicating the problem of determination of force levels, is the fact that the Navy plans to add to ASW capabilities with the 688-class attack submarine in the direct support role. This should also tend to reduce the number of surface combatants required and it does not appear that this factor was taken into account in computing surface force objectives.

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Without a build up and using all surface combatants under 25 years of age, current force levels could be maintained through FY 1983 without any PFs other than the four already funded in FY 1975 and earlier. Without the three FY 1975 PFs, the deficit would be only two ships.

CAPABILITIES OF THE PATROL FRIGATE

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The PF program clearly will augment the capabilities of the force of surface combatants, particularly in the area of

anti-air warfare, by adding PFs to the existing forces and by replacing less capable ships.

The requirement for better AAW capabilities--which includes anti-ship missile defense --presumably is in response to the formidable and growing air and missile threats. Some aspects of the Navy's surface combatant force planning and some implications arising from the characteristics of the PF, however, appear to us to need clarification before one can be confident that the PF is the appropriate answer to the Navy's requirements.

While there appears to be little reason to question the adequacy of the PF's AAW systems for its planned employment in relatively low air threat areas, its limited anti-submarine warfare capabilities raise a number of questions. The PF has a low-powered, short-range hull-mounted sonar and has no provision for possibly backfitting the full capability escort towed array sonar (ETAS). According to Navy officials, ETAS is urgently required along with other modernizations to enhance the ASW capability of surface ships. Although ETAS in some form probably could be backfitted into the PF, a penalty presumably would have to be paid in the form of removal of other equipment as weight compensation. Moreover, even if the weight problem is solved, constraints imposed by available space could lead to other capability-limiting compromises.

The Secretary of Defense, in his annual report, identified the surface combatant deficit as about 30 ships with this deficit to be filled, in part, with PFs. It seems likely that if high-capability ASW ships were substituted for the PFs, as presently configured, new calculations based on much longer range ASW systems would show the deficit to be substantially less than 30 ships. Only a few ships saved could more than compensate for the augmented unit ASW capabilities, leaving a potential for overall savings.

We understand that one concept holds that ocean escorts (DEs) will always be present with PFs and will compensate with their long-range sonars for the PF's ASW detection limitations. While this may be so under certain circumstances, it seems reasonable to assume that the Navy cannot always depend on having DEs present and appropriately stationed for this purpose. Battle damage or other unforeseeable events may prevent it, and tactical requirements may draw the DEs and PFs off station. It may also be desirable to station the DEs with ETASs at a distance from the protected formation where they could take a maximum advantage of their long-range detection capabilities and avoid high

ambient noise levels near the formation. At the same time AAW considerations may require the PFs in stations much closer in where they may have to depend largely on their own ASW resources. No matter what the circumstances, it may be questionable to produce ships that must depend on the sensors of other ships to be fully effective.

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Concerns about the PF stem from its "low-mix" characteristics. We have consistently supported the concept of high-mix and low-mix as a means of countering the rapidly rising costs of ship construction. In the case of the PF, it is a question of whether or not it has the capabilities, particularly the growth potential, to serve a full useful life in the U. S. active fleet. The Navy's experience with surface combatants that have been designed for very low costs has not been encouraging. For example, the Navy recently retired 17 ocean escorts of the Claud Jones, Courtney and Dealy classes from the active fleet when they were only 15-20 years old. They were relatively slow, small and lacking in growth potential. Not only did the Navy not get a full measure of active fleet service from these ships, but while active they contributed less in terms of effectiveness than would have less cost-constrained designs. At the time these ships were being retired, the Navy retained a substantial number of presumably more capable World War II surface combatants that were approaching 30 years of age.

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The PF is, of course, quite a different ship than the DEs. It has broader capabilities including an effective AAW missile system. Nevertheless, there seems to be significant risk that the Navy will repeat with the PF the experience it had with the DEs. Its relatively low level of ASW capability and the lack of provision for the backfit of a full-capability ETAS, already noted, are critical. So also is the prospect that the PF will, like so many other ships, require a major modernization at mid-life. With such prospective modernizations some 20 years in the future the nature of the systems to be backfitted is hardly predictable. Major modernizations in the past have often meant substantial additional weight, and it would seem prudent to provide ample space, weight and moment reservations to accommodate a wide variety of possible backfit requirements. This apparently has not been done.

16
The HARPOON anti-ship missile is expected to give many of our ships an offensive capability against potentially hostile warships. However, the PF, armed with HARPOON, will be substantially inferior in top speed (at 28 knots) to virtually all

modern Soviet surface combatants that are armed with anti-ship missiles. The significance of this is that the faster ship can often use its superior speed to engage or disengage at will and to adjust the engagement ranges to its liking. If the faster ship has longer range missiles--as a few Soviet ships have--it may even nullify HARPOON by remaining outside its maximum range. With the shorter range, but otherwise more lethal missiles that are on the newest Soviet ships, they can close to optimize the attack, actual or potential.

In raising these questions regarding the Navy's surface combatant force level plans and the characteristics of the DEs and PFs, at this time, we have the advantage of information not available to those who made the original decisions. In particular, the potential of new systems such as the escort towed array sonar (ETAS) and HARPOON are much better appreciated. We also recognize that providing adaptability and growth potential adds to the cost of a warship as well as to its life and effectiveness. The benefits, as always, will have to justify the additional cost. It may be that in the past there has been a tendency to under-value adaptability and growth potential because they address future uncertainty and are, therefore, intrinsically difficult to measure.

We have found many praiseworthy features in the PF program. The ship's AAW capabilities seem well suited to the mission and will fill an important need in the fleet. Modernization requirements have been anticipated to the extent of adopting a modular-type design which will facilitate the removal of old systems and installation of new ones. Crew size has been constrained. The Navy also deserves credit for its generally cost-conscious approach to the design of this ship.

You may wish to ask the Secretary of Defense to clarify the Navy's requirements, both quantitative and qualitative, for surface combatants and that the PF in particular, be reassessed in line with the questions outlined above. We are furnishing copies of this letter to the Secretary of Defense and the Secretary of the Navy.

We are addressing essentially identical letters to the Chairman of the Senate Committee on Armed Services and the Chairmen of the Senate and House Committees on Appropriations.

Sincerely yours,

Thomas P. Acheson

Comptroller General
of the United States

Enclosure

ENCLOSURE 1

AVAILABLE UNDERAGE SHIPS, JANUARY 1985

(Includes all ships now in the active fleet* that will be less than the stated expected service life in January 1985 plus all new ships expected to be commissioned by that date from the guided missile frigate and Spruance class destroyer programs plus one patrol frigate. This is the lead ship now under construction.)

SHIP CLASSES/ TYPES	COMMISSIONING DATE OF OLDEST SHIP COUNTED	ASSUMED EXPECTED SERVICE LIFE	
		25 Yr.	30 Yr.
Long Beach (CGN) Nuclear Powered Guided Missile Frigate (DLGN)	9/9/61	1	1
Belknap (DLG 26)	10/6/62	9	9
Leahy (DLG 16)	11/7/64	9	9
Coontz (DLG 6)	8/4/62	9	9
Spruance (DD963)	12/7/59	-	10
Charles E. Adams (DDG 2)	5/9/60	9	-
Sherman (Conv.) (DDG 31)	FY 1976	30	30
Sherman (DD931)	9/10/60	23	23
Brooke (DEG 6)	12/7/56	-	4
Bronstein (DE 1037)	11/9/55	-	14
Garcia (DE 1040)	3/12/66	6	6
Knox (DE 1052)	6/15/63	2	2
Patrol Frigate (PF) (Lead Ship)	12/21/64	10	10
	4/12/69	46	46
	FY 1977	1	1
TOTAL SHIPS		155	174

* Includes one in conversion.